

Use of Modern Industrial Technologies in Architecture

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Annotation: The article discusses the possibilities of using modern industrial technologies in the context of creating architectural objects. Using such technologies allows you to maintain the uniqueness of each object in the construction of architectural objects. The focus is on creating interesting textures and details using modern industrial technologies.

Key words: modern industrial technology, 3D printer, 3D printing, surface texture, design, structure, decorative, building construction, capabilities.

Introduction. In architecture, standard designs using prefabricated structures produced by construction companies are widely used. Construction is mainly based on a single modular system.

In the XXI century, CAD (computer-aided design systems) is actively developing. This applies in particular to systems such as ArchiCAD, AutoCAD, Revit, and others. Design automation simplifies and speeds up the process of converting ideas into shapes, the final object, as the program analyzes and regulates the parameters of the created structural elements: "Thanks to the capabilities of mathematical modeling (computational design) works again. That's why he can quickly determine the shape of a building or a complex of structures. " In the 21st century, such an automated innovation is the development of modern industrial technology, where all stages from the foundation to the roof are assembled with the same element and strictly on the same technology, and the designer now depends on the prefabricated structures it's not.

Material and methods. The article discusses the use of modern industrial technologies in the field of architecture on the basis of methods of systematic, logical, functional analysis, comparative, statistical analysis.

However, the following sources were used to cover the article:

- Kulnazarova Z.B. (2021). Prospects for the future development of architecture in Samarkand. Monograph. - Samarkand: SamDAQI, 124.
- Odilovich, R. Z., & Bakhromovna, K. Z. (2021). The importance of hotel building architecture for the development of tourism in Uzbekistan. *Emergent: Journal of Educational Discoveries and Lifelong Learning (EJEDL)*, 2 (04), 118-121.
- Odilovich, R. Z., & Bakhromovna, K. Z. (2021). Architecture of Samarkand in the development of tourism. *Innovative Technologia: Methodical Research Journal*, 2 (04), 78-81.

Results. Modern industrial technologies represent the layered construction and synthesis of an object using computer 3D technology (Figure 1) and are one of the most promising areas in high-tech industrial construction; The so-called 3D industry is now booming. In these technologies, the material is added by a 3D printer to create the object; therefore, the term "3D printing" is equally used alongside the term "modern industrial production".



Figure 1. Layer-by-layer application of the mixture using a 3D printer

The use of 3D technology is possible throughout the life cycle of the production facility: from design to implementation; this also applies to all components of industrial production in the organization of construction processes.

Modern industrial technologies create opportunities for the implementation of complex objects and the evolution of the construction process. Industrial production ceases to be "conventional", modern industrial technologies allow to diversify the objects produced by changing the parameters of the computer model with minimal means.

The design of a structure built using modern industrial technology requires, first of all, the creation of a three-dimensional model with a given thickness of the elements and the choice of filling the element size. Many architects see the potential of this technology and offer designs that reveal the full potential of modern industrial production.

Modern industrial production of buildings and various structures significantly reduces construction time due to 3D printing.

A shining example of the speed, quality and originality of an architectural solution - the Dubai office complex, published in 17 days - a project successfully implemented using layers of material (Figure 2).

An example of a project using this method is a 32-square-meter "printing house" in the Moscow region (Figure 3) using its own 3D printer, led by Apis Kor from Irkutsk.



Figure 2 - Office complex in Dubai

**Figure 3 - 32 sq. M. In Stupino**

Modern industrial production, like the steel bridge developed by Joris Laarman's laboratory, allows the structure to combine structural qualities and open work decorativeness (Figure 4). The Dutch architect used the opportunity to build a complex object at the design and construction stage. Janjaap Ruijssenaars designed the building in the form of the Möbius line (Figure 5), where his task was only to create an image of the object.

Figure 4 - Construction of the bridge**Figure 5 - Project of the house "Infinite Tape"**

Examples of modern industrial buildings reflect the uniqueness of industrial architecture. As a result, we say goodbye to the usual and unconventional notion of industrial production; and these are new technologies that open up new possibilities in the creation of original objects. In addition, the architecture built with such tools is characterized by the ability to create unique details in its composition. In the architecture of the last decades, attention to detail is reflected in the work with surface textures both externally and internally. Most important is the ability to combine constructive qualities, three-dimensional architectural image and decorative facades. Due to the robustness of the entire building system, the reliefs can be incorporated into the pattern of the walls and other elements during the construction phase of the computer model.

Therefore, the use of modern industrial production to decorate the facades and other vertical surfaces of the building is a significant trend.

Consider examples of the use of modern industrial technologies in the context of creating a unique image of an architectural object, where aesthetic originality is associated with the creation of unique reliefs on vertical surfaces created in the process of modern industrial production.

The Italian company WASP has presented a Gaia house with an area of 30 square meters. An interesting parametric texture of the walls has been announced, which can be easily modeled and built using modern industrial technologies. It should be noted that the new technology allows you to create a truly unique wall pattern (Figure 6).

In 2017, the Danish company COBOD presented its small office located near the port of Copenhagen. The creation of a relief with a wave effect in the plane of the wall is unique in that it introduces a new image into the architecture in the context of shaping the original appearance of the object (Figure 7).



Figure 6 - Gaia Residential Building



Figure 7 - Office in Copenhagen

Conclusion. In short, modern industrial technology makes architecture: more complex and expressive; conditions for accelerating and at the same time simplifying the creation of innovative forms; will have technological capabilities for new options of wall texture.

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